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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/625,493	07/25/2000	Morio Gaku	2000-1033A	6721

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EXAMINER

PIERCE, JEREMY R

ART UNIT	PAPER NUMBER
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1771

DATE MAILED: 08/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/625,493	Applicant(s) GAKU ET AL.	
	Examiner Jeremy R. Pierce	Art Unit 1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 21, 2004 has been entered.

Response to Amendment

2. Applicant's amendment filed on April 21, 2004 has been entered. Claim 1 is amended. Claims 1-5 are currently pending. The amendment is sufficient to overcome the 35 USC 112 and 103 rejections set forth in the last Office Action because the claims now recite that the laminate has a small-diameter hold formed by irradiation with a carbon dioxide laser, which is not taught by the Ishii et al. (U.S. Patent No. 5,368,921) and Touzaki (JP 11-77892) references. However, new grounds of rejection are made, as set forth below.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites "the laminate having a small-diameter hold formed by irradiation." How small must the hole be in order to be considered "small-diameter?" "Small-diameter" is a relative term. Does the limitation mean less than 0.15 mm, as discussed in the specification on page 1, line 30?

Claim Rejections - 35 USC § 103

5. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al. (U.S. Patent No. 5,368,921) in view of Sakaguchi et al. (EP 768,814), Touzaki (JP 11-77892), and Kawakita et al. (U.S. Patent No. 5,817,404).

Ishii et al. provide a metal foil-clad laminate obtained by lamination molding a resin-impregnated substrate and a metal foil (column 2, lines 22-24). The resin is dissolved in a solvent (column 4, line 50). The substrate can be a woven glass fabric with a preferred thickness of 0.05 to 0.2 millimeters (column 2, lines 57-66), but Ishii et al. do not teach the basis weight of the glass fabric. Sakaguchi et al. disclose that a woven glass cloth for circuit boards may be used that has a basis weight of only 15 to 30 grams per square meter (Abstract). Sakaguchi et al. teach a method of providing such lightweight glass without sacrificing strength properties (page 2, lines 47-55). It would have been obvious to a person having ordinary skill in the art at the time of the invention to use a glass fabric weighing between 15 and 30 grams per square meter in

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the circuit board of Ishii et al. in order to provide a lightweight material, as taught by Sakaguchi et al.

Ishii et al. also do not teach the gas permeability of the glass fabric. Touzaki teaches the permeability of glass fabrics for making a copper-clad laminate is preferably 1-15 cc/cm²/sec to obtain a laminate where air bubbles aren't present and the resin constituent sufficiently sinks into the glass fabric (Paragraph 10). It would have been obvious to one having ordinary skill in the art to use a glass fabric with a permeability between 1-15 cc/cm²/sec in the laminate of Ishii et al. in order to have the resin sufficiently sink into the prepreg without forming air bubbles, as taught by Touzaki.

Finally, although all of the above references are directed to printed circuit boards, none of the references teach making a small diameter hole in the material with a carbon dioxide gas laser. Kawakita et al. teach that higher performance is achieved in printed circuit boards by making inner-through-hole connections (column 1, lines 10-31). Kawakita et al. also teach that small-diameter, i.e. 0.15 mm, holes are made by using a carbon dioxide laser (column 10, lines 45-51). It would have been obvious to a person having ordinary skill in the art at the time of the invention to make small diameter holes in the composite of Ishii et al. in order to improve performance of the circuit board, as taught by Kawakita et al.

With regard to claim 2, Ishii et al. teach the thermosetting resin is blended with inorganic filler in the amount of from 10 to 45% by weight based on the total amount of the resin solid or from 5 to 30% by weight of the substrate (column 4, lines 6-19). With regard to claim 3, Ishii et al. disclose the prepreg to have 55% weight of resin solid and

inorganic filler in his examples (column 5, line 7). Therefore, the glass content of the prepreg must be 45% by weight, which falls within the Applicant's claimed range of 25 to 70% by weight. With regard to claim 4, with the disclosed substrate thickness of 0.05 to 0.2 millimeters disclosed (column 2, lines 57-66), the thickness of the copper-clad laminate would inherently fall into the Applicant's claimed range of 0.03 to 0.15 millimeter upon typical impregnation of the resin and when typical copper foil is clad on the outside of it. With regard to claim 5, Ishii et al. disclose using a cyanate ester resin as the thermosetting resin used to impregnate the substrate (column 3, lines 16-18).

Response to Arguments

6. Applicant's arguments with respect to claims 1-5 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

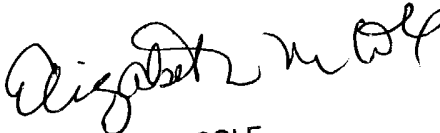
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeremy R. Pierce whose telephone number is (571) 272-1479. The examiner can normally be reached on Monday-Thursday 7-4:30 and alternate Fridays 7-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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ELIZABETH M. COLE
PRIMARY EXAMINER